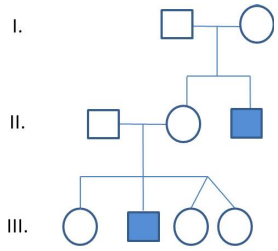
Question **1**

Given pedigree depicts occurrence of _____disease, such as_____



Select one:

- a. Autosomal dominant, Huntington disease
- b. Multifactorial type of inheritance, diabetes mellitus
- c. X-linked recessive, haemophilia
- d. Autosomal recessive, phenylketonuria

Question **2**

Which of the following molecules are the major components of biomembranes in all organisms?

Select one:

- a. proteins and saccharides
- b. phospholipids and cholesterol
- c. phospholipids and nucleic acids
- d. phospholipids and proteins
- e. proteins and oligosaccharides

Question **3**

Where can you find foramen magnum?

Select one:

- a. between occipital bone and temporal bone
- b. between occipital bone and parietal bone
- c. in temporal bone
- d. in parietal bone
- e. in occipital bone

Question **4**

Which of the following diseases **is not** a so-called civilization disease?

Select one:

- a. cancer
- b. obesity
- c. heart and circulatory system diseases
- d. diabetes mellitus
- e. rheumatism

Question **5**

Which of these is an **INCORRECT** statement concerning homeostasis?

Select one:

- a. There are few negative feedback based homeostatic systems in the human body.
- b. A positive feedback system, for instance, the blood clotting cascade or the process of delivering a baby
- c. Homeostasis is the dynamic equilibrium of the internal environment with small fluctuations that is maintained by living organisms
- d. A negative feedback system like the control of blood sugar levels by insulin and glucagon and control of urine concentration by ADH
- e. Two critical parts of homeostasis are sensory receptors and effectors which restores inner balance

Question **6**

Which inhibitor binds to the active site of an enzyme?

Select one:

- a. irreversible inhibitor
- b. competitive inhibitor
- c. inactivated inhibitor
- d. non-competitive inhibitor
- e. allosteric inhibitor

Question **7**

What is a marker gene?

Select one:

- a. It is a gene that enables a determination of a starting sequence for the translation
- b. It is a gene for the antibiotic resistance that enables bacteria that taken up the vector, with a certain gene of interest, to survive and grow in media containing antibiotics
- c. It is a DNA sequence that shows where the restriction endonuclease should start, to cut a DNA strand
- d. All answers are correct
- e. None of given answers are correct
- f. It is the first cloned gene in Human Genome Project

Question **8**

Which of the following is **NOT** a function of liver in adults?

Select one:

- a. Bile production
- b. Haematopoiesis
- c. Detoxification from poisonous substances
- d. Storage of vitamins A,D,E,K, B12 and iron
- e. Glucose storage

Question **9**

The hypothalamus

Select one:

- a. has no hormone receptors on its cells
- b. is only a target for hormones because it has numerous receptors on its cells
- c. includes neurosecretory cells that terminate in the posterior pituitary
- d. secretes hormones which directly influence function of gonads
- e. functions only in neuronal transmission

Question **10**

What is the most accurate definition of a xerophyte organism?

Select one:

- a. Autotrophic component of a plankton
- b. Plants living in an aquatic habitat
- c. Plants with the ability to survive in dry/desert habitats
- d. Organism changing modes between autotrophy and heterotrophy
- e. Parasitic plant species attacking coniferous plants

Question **11**

Choose correct statement:

Select one:

- a. the epiglottis prevents swallowed food from entering the trachea
- b. the bolus enters the larynx after leaving the oral cavity
- c. most of digestive enzymes are secreted into the oesophagus
- d. the trachea is connected to the oesophagus
- e. all types of foods begin their enzymatic digestion in the mouth

Question **12**

Choose the correct cellular parameter:

Select one:

- a. Nerve cells can have many axons but only one dendrite
- b. The Thickness of plasma membrane is 20 nm
- c. Average size of human erythrocyte is 7,5 μm
- d. Length of human nerve cell will not exceed 10 cm
- e. Size of the human egg cell is 50 μm

Question **13**

The “motor unit” in human skeletal muscle corresponds to:

Select one:

- a. one motor neuron and all of the muscle fibres on which it has synapses
- b. an entire head (origin) of the muscle in two-headed, three-headed and four-headed muscles
- c. all actin and myosin filaments of one sarcomere
- d. all sarcomeres of one myofibril
- e. one actin binding site coupled to one myosin binding site

Question **14**

Which statement is true concerning skeletal system of the human palm and fingers?

Select one:

- a. Each finger on the hand has 4 phalanges
- b. The human hand (palm) has in each finger 3 bones (phalanges)
- c. There are 7 metacarpal bones in human palm
- d. Polydactyly is a condition with more than the expected number of fingers
- e. all options are correct
- f. The thumb has 5 bones and the other 4 fingers have 3 bones each

Question **15**

Which of the following CANNOT be considered as an endocrine organ?

Select one:

- a. Thyroid gland
- b. Placenta
- c. Pituitary gland
- d. Pancreas
- e. Thymus gland
- f. Liver

Question **16**

What is the FALSE statement regarding induced pluripotent cells (iPS)?

Select one:

- a. iPS cells are prepared by reprogramming of differentiated cells, for example fibroblasts
- b. iPS arise from inner cell mass from the early stage embryo giving rise to all three germ layers
- c. For regeneration purposes it is more ethical to use iPS cells than pluripotent cells from embryos
- d. for reprogramming somatic cell into iPS four genes encoding transcription factors are added

Question **17**

Two plants are crossed, resulting in offspring with a 3 : 1 ratio for a particular trait. What does this suggest?

Select one:

- a. a blending of traits occurred
- b. both parents were heterozygous for a given trait
- c. the parents were true-breeding for contrasting traits
- d. the trait shows incomplete dominance
- e. all individuals in offspring have the same alleles for given trait

Question **18**

Trace elements are elements that are required by an organism in low quantities. Which element is a trace element that is required by humans but it is not required by bacteria and plants?

Select one:

- a. calcium
- b. sodium
- c. nitrogen
- d. phosphorus
- e. iodine

Question **19**

Human primary spermatocyte and primary oocyte:

Select one:

- a. Both can undergo mitotic division
- b. Both cells are diploid
- c. The primary oocyte is diploid but primary spermatocyte is haploid
- d. The primary oocyte cannot undergo mitotic division but the primary spermatocyte can undergo mitotic division to provide an enormous number of sperm cells
- e. Both cells are haploid

Question **20**

Autosomes are

Select one:

- a. All chromosomes that are not sex chromosomes
- b. Vesicles formed after engulfing intracellular organelles by cell itself
- c. Located only in sex chromosomes
- d. Sex chromosomes after recombination
- e. Synonym for heterochromosome

Question **21**

Which cells do produce antibodies (immunoglobulins)?

Select one:

- a. T lymphocytes only
- b. lymphocytes and macrophages
- c. mainly B lymphocytes but some antibodies are also produced by T lymphocytes
- d. macrophages
- e. B lymphocytes only

Question **22**

Which statement concerning plasma cells is correct?

Select one:

- a. Plasma cells are an activated form of activated T helper cells
- b. Plasma cells are an activated form of B lymphocytes producing specific antibodies against specific pathogen
- c. Plasma cells trigger inflammation upon infection of an organism by bacterial or viral pathogens
- d. Plasma cells mature in the pancreas
- e. Plasma cells are important in innate (non-specific) immunity

Question **23**

Which is the most correct statement regarding the human urinary system?

Select one:

- a. High levels of urea in the blood, called uraemia, is a physiologically normal condition
- b. The glomerular filtrate contains the same molecules as the final urine
- c. Uric acid is the primary nitrogenous waste, a by-product of amino acid metabolism in humans
- d. Urea, produced in the liver, is the primary nitrogenous end product of the human body

Question **24**

Which statement is true for the role of calcium ions in the cell?

Select one:

- a. Ca 2+ ions usually terminate signalling cascades
- b. Ca 2+ ions act as second messenger during cell signalling
- c. Ca 2+ ions split and degrade calmodulin
- d. Ca 2+ ions are produced in the Golgi apparatus by protein precursor
- e. Ca 2+ ions are kept at higher concentration in the cytosol than in the extracellular fluid

Question **25**

Define what is an anticodon

Select one:

- a. Four bases in tRNA complementary to a coding strand in DNA
- b. A sequence of three bases in tRNA, that is complementary to a codon in mRNA
- c. Three bases in mRNA complementary to a non-coding strand
- d. Sequence of three bases that affects promotor site where transcription factors attach

Correct answers:

1 C
2 D
3 E
4 E
5 A
6 B
7 B
8 B
9 C
10 C
11 A
12 C
13 A
14 D
15 F
16 B
17 B
18 E
19 B
20 A
21 E
22 B
23 D
24 B
25 B